

Governor, which is between the two former places with respect to both position and elevation, $t = 70^{\circ}5$, $p = 27.41$ in., from observations kindly made for me by Captain Lanyon, A.D.C.; so that the calculated difference of temperature between Kingston and Craighton is $8^{\circ}3$, the observed difference; and the calculated difference between Craighton and Newcastle is $3^{\circ}55$, which is only $0^{\circ}05$ too large. And since the equation has been found to hold good under different circumstances at lower elevation, we may suppose that it is strictly true for Jamaica.

With regard to balloon ascents, I have before me two tables, one compiled by Sir John Herschel, and the other by Prof. Loomis, from more recent observations, and these are brought into the same form in the following table in order to compare them; the first column contains the fall of the barometer in inches, the second contains the corresponding fall of temperature from Herschel's Meteorology, the third from Loomis's Meteorology, and the fourth contains the mean of the numbers in the second and third, which we shall consider to be the average results obtained from balloon ascents.

1	2	3	4	5	6
$t_0 - p$	H	L	$t_0 - t$	Calc.	Diff.
10.	0	0	0	0	0
2	3.0	10.1	6.6	6.3	+ 0.3
4	6.8	17.3	12.1	12.6	- 0.5
6	11.3	23.2	17.3	18.9	- 1.6
8	16.9	29.0	23.0	25.2	- 2.2
10	23.6	34.7	29.2	31.5	- 2.3
12	31.4	40.5	36.0	37.8	- 1.8
14	40.8	46.3	43.6	44.1	- 0.5
16	51.8	51.7	51.8	50.4	+ 1.4
18	63.7	56.1	59.9	56.7	+ 3.2

Now if we take $t_0 - t = (p_0 - p)$, we shall get nine equations of condition for finding λ ; the most probable value of this quantity is $3^{\circ}15$, which hardly differs from the value found in Jamaica. Again, if we calculate $t_0 - t$ and employ this value of λ , we get the fifth column, and it will be noticed that the differences in the last column between the observed and calculated quantities are very small when we consider the great differences between the second and third column.

Therefore the equation $t_0 - t = \lambda (p_0 - p)$ holds good for about two-thirds of the whole atmosphere, and if it holds good for the remaining third, by putting $p = 0$, we shall obtain the difference between the temperatures at the lowest and highest strata of the atmosphere; this difference is about 94° , so when the temperature at the surface of the earth is 50° , the temperature at the superior limit of the atmosphere must be -44° .

Since the temperature falls $3^{\circ}15$ for every inch the barometer may fall, or for every 945 ft. we may ascend (when that temperature is about 50° and the elevation low), the temperature in England will fall 1° for every 300 ft.; this has been always acknowledged, and we now see that it is a consequence of the more general law which connects temperature and pressure throughout the atmosphere.

Now though we may suppose that λ has this value for all insular climates, yet it cannot have the same value for continental climates, on account of the higher temperature of the land; but still there is every reason for supposing that, at any given instant of time, λ is constant for all points in the same vertical line; and when it has been determined from the observed temperatures and pressures at any two points in that vertical, our equation becomes especially adapted for the barometrical measurement of the distance between them.

It only remains for me to say that I have already used the equation when making a series of observations among the hills in the north of England, and always found it true when the weather was settled, and sufficient time and care taken in obtaining the mean temperatures of the different strata of air.

Jamaica

MAXWELL HALL

Larvæ of Membracis serving as Milk-cattle to a Brazilian Species of Honey-bees

THE connection between the ants and the Aphides has long since been generally known; in the proper season we always find ants very busy on those trees and plants on which the

Aphides abound, and if we examine more closely we discover that their object in thus attending upon them is to obtain the saccharine fluid which they secrete from two setiform tubes placed one on each side just above the end of the abdomen, and which may well be denominated their milk (Kirby and Spence, "Introduction to Entomology," 7th edition, p. 335). It has also long been observed and described, that not only do the Aphides yield this repast to the ants, but also the Cocci, and that in the tropical regions of India and Brazil, where no Aphides occur, the ants milk the larvæ of several species of Cercopis and Membracis (Kirby and Spence, p. 336; Westwood, "Modern Classification of Insects," II. p. 434). Recently Prof. F. Delpino, of Vallombrosa, near Florence, observed the same connection



Fig. 1.—Lateral view of larva. Fig. 3.—Front view of head of imago.

between *Formica pubescens* and *Tettigometra virescens* ("Bolletino Entomologico," anno IV. Settembre 1872). But, as far as I know, it has never been observed hitherto that honey-bees also nourish themselves by the secretion of certain hemipterous insects. Hence the following observation, made some months ago by my brother, Fritz Müller (Itajahy, Prov. St. Catharina, Brazil) may be worth publishing.

Among the great number of species of Melipona and Trigona which, in the tropical and subtropical regions of America, as is known, occupy the place of our hive-bee, there is one small species of Trigona which has only once been found by my brother on flowers (of *Sicyos angulata*), and which seems to nourish itself in a very strange manner. He once found a multitude of them spread over the body, already strongly putrifying, of a large toad; the interior of the large open mouth of the toad was filled with these bees, probably sucking the putrid juice of the dead body. On another occasion he saw a great

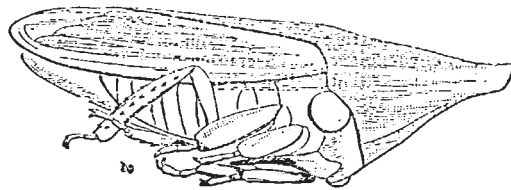


FIG. 2.—Lateral view of imago.

number of the same species of bees in the putrifying intestines of a hen. Repeatedly he saw them sucking the juice flowing out of trees.

In consequence of other observations this same species of Trigona is supposed by my brother to suck the secretion of the larvæ of a certain hemipterous insect belonging to the genus Membracis, or to a closely allied one. As I do not precisely know the name of this supposed milk-cow, I here give the illustration of its larvæ and imago, drawn from specimens sent me by my brother.

He found the pedunculi of the flowers of *Cassia multijuga* pretty frequently occupied by societies of larvæ of this species closely crowded together. Amongst these larvæ there was present a great number of the above-mentioned Trigona, marching all the day long amongst and upon them. When taken between the fingers, the larvæ of Membracis immediately emitted a little drop of a limpid fluid from the upward bent tip of their abdomen—probably a sweet fluid, for the sucking of which the larvæ are visited by the Trigona.

Unfortunately the specimens of this Trigona, enclosed in a letter sent me by brother, arrived here quite broken, so as not

to be determinable; but in a future number of this journal I hope to be able accurately to name both the supposed milker and the supposed milk-cow.

Lippstadt

HERMANN MÜLLER

Free-Standing Dolmens

MR. LUKIS, in a paper recently read before the Society of Antiquaries, nominally "On certain Erroneous Views respecting the Construction of French Chambered Barrows," but really a method of criticising severely Mr. Fergusson's work on the "Rude Stone Monuments," states that it is an "error" to suppose that the Dolmens of that country were ever free-standing; in other words, he lays down the "rule," "there were no free-standing dolmens in France." The announcement that, with regard to monuments of whose fashions we know absolutely nothing, a universal negative of this kind can be safely laid down as a law, would be startling, did it not come from one who is backed by such extensive inductive evidence as is Mr. Lukis. His "rule" was "established by the extreme rarity of the instances." This being the case, he calls those "in error" who would, from these instances, form a small class, or species of dolmen. As, in an essay on the Cornish sepulchral monuments, which you recently most kindly reviewed at length, I am committed to this latter view—one, by the way, which I had struck out for myself before the appearance of the "Rude Stone Monuments,"—will you kindly permit me to call your attention to one structure which I have ventured to place, and shall still venture to place, in the discarded class? I do so as a protest against the dictum of Mr. Lukis being extended to our British examples, before a careful scrutiny has been made of every monument of the kind from one corner of our islands to the other. On this single instance, such as it is, it must be clearly understood that I build no theory; it will be for others to judge whether it does not afford some evidence of the difference in construction and use of the dolmen or table-stone proper, and the kist-vaen cromlech; one thing only I will add, that, limited as my experience is to the monuments of Britain, I shall not be exposed to the temptation of explaining away any observed fact in order to reconcile a doubtful comparison. Without feeling that I am guilty of "dabbling in archæology," or of setting forth "any dogmatic expositions of hypotheses" (!), or of "establishing my proposition from second-hand information," or in short of being the victim of any very "erroneous view" (all which faults Mr. Lukis finds in those who differ from him), I consider that the following facts justify my statement that the monument I am about to describe always was, as it is now, a free-standing dolmen.

At Lanyon, in the parish of Madron, Cornwall, stands a tripod dolmen, or cromlech, consisting of three slim pillars of unhewn granite supporting on their summits a horizontal stone over 40 ft. in circumference and averaging 20 in. thick. In 1815 it fell; but previous to its fall a man on horseback could sit upright underneath the cap-stone. In 1824 it was again set up; but two drawings had been made of it in its pristine condition, one by Canon Rogers in 1797, and the other by no less accurate a draughtsman, half a century before, namely, by my ancestor, Dr. Borlase. Both these drawings agree in representing the extreme slimness of the pillars; their distance apart; and the great height of the monument; features which render it not unlike a gigantic three-legged milking stool. Then, as now, there was no mound about it, as there is in the case of each and all of the kist-vaen cromlechs. It stood on a low bank of earth, and the area had been often disturbed by treasure seekers. No houses are near it which could have received the stones of a denuded mound. Added to this, it is difficult to see how a kist-vaen, or *septum* of any kind, could have been formed beneath the cap-stone. Had a wall of small stones been built up from pillar to pillar the weight of the superincumbent mound must have forced them inwards, a catastrophe which the "dolmen-builders" were always most careful to avoid. Secondly, had large stones placed on edge formed the walls of the kist, how is it they are all removed, while every other cromlech in the district retains them? But, laying aside this evidence, my strongest proof is yet to come. The interment in this instance was *not in the kist at all*. A grave had received the body six feet under the natural surface of the surrounding soil, and within the area described by the structure. This being the case, of what use could an enclosed kist have been; or why should the cenotaph be covered in at all? Add to this again, that on the southern side of the structure, and

so near it that a mound over the monument must inevitably have covered it up, stands a little circular ring cairn of the ordinary type, in the centre of which I found the remains of an inner ring, which, though now rifled, had doubtless contained an interment. Must I then explain away in deference to superior experience or received opinion each and all of the above facts, in order to reconcile this monument with those which seem to be totally different structures, viz., the kist-vaens? Should I not by so doing be sacrificing a fact to an hypothesis, and is not that hypothesis of such a nature that even a single instance well established must shake it to its foundation? Should I not incur a charge of erroneousness equal to, if not greater, than that which Mr. Lukis brings to bear on all who differ from him?

No one can wish more than I do to see errors expunged, and the truth in these matters arrived at; but I must confess that I cannot see how this will be brought about by confronting one hypothesis with another equally dogmatic, and more universally inclusive.

WILLIAM C. BORLASE

Castle Horneck, near Penzance

Fertilisation of the Pansy

I AM glad to be able to confirm, to some extent, from observation, Mr. Bennett's theory of the fertilisation of the Pansy, given in NATURE, vol. viii. p. 49. I watched a considerable number of specimens of *Viola tricolor* on a grassy hill-top where the smaller insects were very numerous and busy, and twice saw them entered by a minute fly. In the first case the insect was dusty with pollen when it arrived. It settled on the lower petal and walked up one of the black lines to the gap in the ring of anthers, through which it entered with some difficulty—leaving some of the foreign pollen on the stigma as it passed. When it came out it had still more pollen on it than when it went in, and again in passing the stigma it left some on it. It paused a moment on the lower petal to clean itself, and left a little ball of pollen on the hairs on one side of the stigma. In the second case, the insect alighted first on one of the upper unmasked petals, turned round and round as though seeking the guiding lines, and flew off to the lower petal, where, without hesitation, it followed the guiding lines as the other had done. After it had passed the stigma there was no pollen visible on its surface; but after it had come out, almost the whole of the lower half was covered. In each case the passage through the ring of anthers seemed rather a struggle. There were many bees about, but I did not see any of them visit the *Viola*, although they were almost the only flower near.

A. T. MYERS

Penrith, June 30

European Weeds and Insects in America

A CANADIAN friend writes to me:—"I have heard or seen it mentioned as a fact that European weeds and insects introduced into America flourish for a while, but after fifty or sixty years gradually disappear: for instance, that the Hessian fly (so called from having been brought over by the Hessian troops in their hay in the war of independence) has died out or ceased to give trouble, though at one time it totally destroyed the wheat crops of New England. I do not know how far the facts have been tested, or how far they are owing to improved agriculture."

This statement, if true, is obviously of great importance. Can any of your correspondents confirm or disprove it?

JOSEPH JOHN MURPHY

Old Forge, Dunmurry, July 4

CHLOROPHYLL COLOURING-MATTERS†

IT would be impossible for me not to look upon the appearance of such a work as the one recently published by Dr. Gregor Kraus with much satisfaction, since the chief object of the author is to call the attention of his countrymen to the value of the spectrum-microscope in studying the colouring-matters of plants. He commences with a description of the instrument, and says that, though originally designed for the examination of microscopical objects, it is not only as useful as any

* The only other tripod dolmen in Cornwall, viz., that at Caerwynnen, is also a free standing one (within the memory of man, at least), whereas the kist-vaens are one and all partially covered by their envelope.

† "On the Chlorophyll Colouring-Matters." ("Zur Kenntniss der Chlorophyllfarbstoffe und ihrer Verwandten"). By Dr. Gregor Kraus. (Stuttgart, 1872.)